

Rotary drives ERMO, electric



# Rotary drives ERMO, electric

Key features

## At a glance

### General

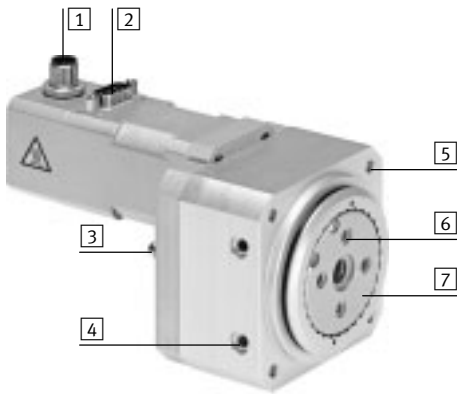
- Electric rotary drive with stepper motor and integrated gear unit
- ServoLite – closed-loop operation with encoder
- Heavy-duty bearing for high forces and torques
- Backlash-free pre-stressed rotating plate with very good axial eccentricity and concentricity properties

- Optional holding brake
- Hollow shaft for energy throughfeed for attachments
- Quick and accurate installation

### Range of applications

- Rotating and positioning parts
- Simple rotary indexing table applications
- As a rotary axis in multi-axis applications

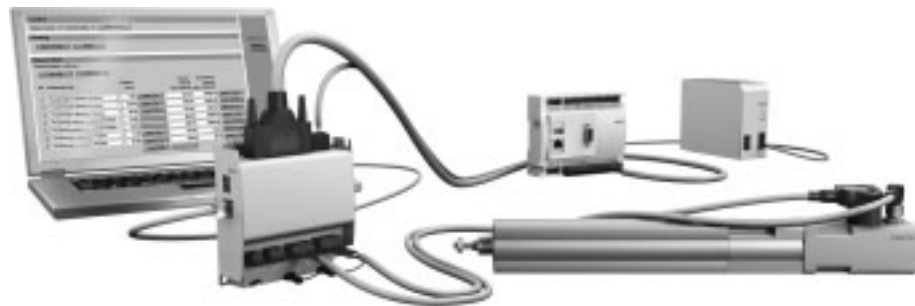
## The technology in detail



- 1 Encoder connection
- 2 Motor connection
- 3 Proximity sensor for homing or position sensing
- 4 Thread/centring holes for mounting
- 5 Thread for mounting
- 6 Thread/centring holes for attachments
- 7 Rotating plate

## Optimised Motion Series (OMS) – Package solution with motor and motor controller

A package that makes positioning easier than ever before. The Optimised Motion Series is as easy to handle as a pneumatic cylinder, but with the functionality of an electric drive.



### Simple choice

- Easy sizing and selection using cycle time charts
- No specialist knowledge of electric drive technology required

### Ordering and logistics

- All the necessary component parts with a single part number
- Motors mounted on rotary drive

### Quick to configure

- Parameterisation and commissioning via web server/browser
- Parameterise up to 7 freely definable positions directly on the PC



## For simple positioning tasks

Rotary drive ERMO



Controller CMMO

→ Internet: [cmmo](http://cmmo)

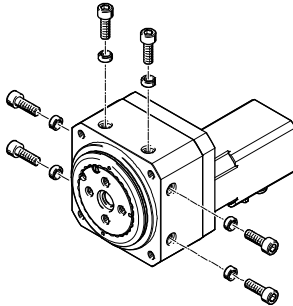


# Rotary drives ERMO, electric

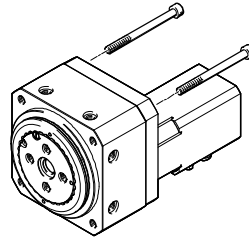
Key features

## Mounting options

At the side

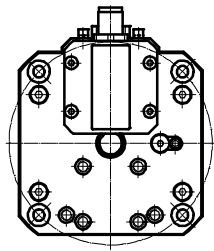


From the front/rear

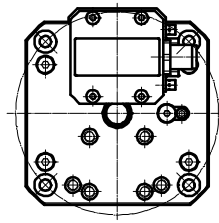


## Motor attachment variants

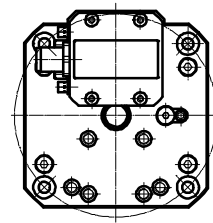
Top (standard)



Left (feature L)

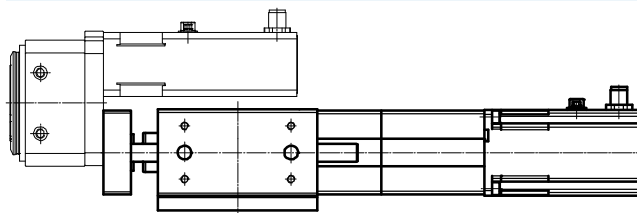


Right (feature R)



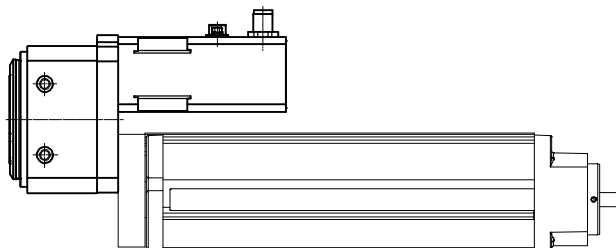
## Direct mounting options with drives from Festo

With electric cylinder EPCO



Size	Base axis		
	EPCO-16-...-KF	EPCO-25-...-KF	EPCO-40-...-KF
Assembly axis			
ERMO-12	■	-	-
ERMO-16	-	■	-
ERMO-25	-	-	■

With mini slide EGSL



Size	Base axis		
	EGSL-35	EGSL-45	EGSL-55
Assembly axis			
ERMO-12	■	-	-
ERMO-16	-	■	-
ERMO-25	-	-	■
ERMO-32	-	-	■

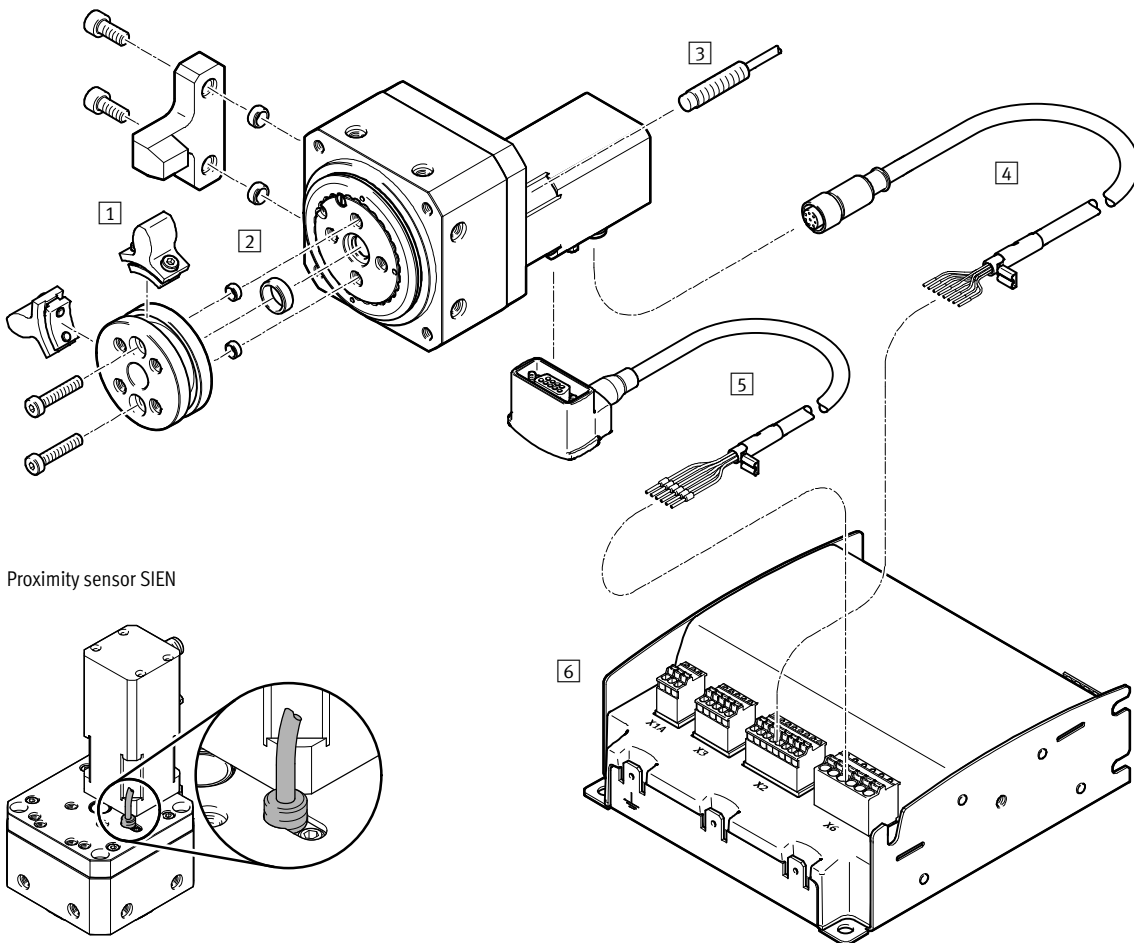
# Rotary drives ERMO, electric

Type codes

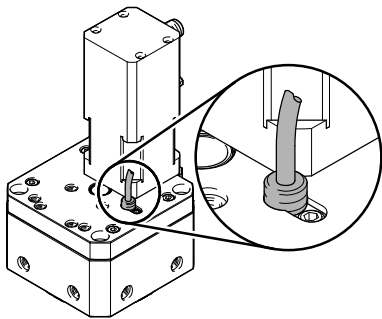
		ERMO	-	16	-	ST	-	E	B	-		+	5E	+	C5		DIO		P
<b>Type</b>																			
ERMO	Rotary drive																		
<b>Size</b>																			
<b>Motor type</b>																			
ST	Stepper motor																		
<b>Measuring unit</b>																			
E	Encoder																		
<b>Brake</b>																			
-	None																		
B	With brake																		
<b>Cable outlet direction</b>																			
-	Top (standard)																		
L	Left																		
R	Right																		
<b>Connecting cable to motor controller</b>																			
-	None																		
1.5E	1.5 m, straight plug connector																		
2.5E	2.5 m, straight plug connector																		
5E	5 m, straight plug connector																		
7E	7 m, straight plug connector																		
10E	10 m, straight plug connector																		
1.5EA	1.5 m, angled plug connector																		
2.5EA	2.5 m, angled plug connector																		
5EA	5 m, angled plug connector																		
7EA	7 m, angled plug connector																		
10EA	10 m, angled plug connector																		
<b>Controller type</b>																			
C5	CMMO, 5 A																		
<b>Bus protocol/activation</b>																			
-	None																		
DIO	Digital I/O interface																		
LK	IO-Link																		
<b>Switching input/output</b>																			
-	None																		
N	NPN																		
P	PNP																		

# Rotary drives ERMO, electric

Peripherals overview




Proximity sensor SIEN



Accessories			
Type/order code	Description		→ Page/Internet
1 Stop kit EADP	<ul style="list-style-type: none"> <li>• For homing to the end position</li> <li>• As end stop for rotary drives with no brake</li> <li>• For safety functions</li> </ul>		18
2 Centring sleeve ZBH	<ul style="list-style-type: none"> <li>• For centring attachments</li> <li>• For centring the rotary drive</li> </ul>		19
3 Proximity sensor SIEN	For homing or position sensing		19
4 Encoder cable NEBM	For connecting the encoder and controller		20
5 Motor cable NEBM	For connecting the motor and controller		20
6 Motor controller CMMO	For positioning the rotary drive		20

## Rotary drives ERMO, electric

Technical data

 Size

12, 16, 25, 32



General technical data					
Size	12	16	25	32	
Design	Electromechanical rotary drive with integrated gear unit				
Angle of rotation	Infinite				
Repetition accuracy <sup>1)</sup>	[°]	±0.05	±0.05	±0.05	±0.1
Torsional backlash <sup>1)</sup>	[°]	0.2			
Positioning time	→ 8				
Gear ratio	9:1			7:1	
Step angle with full step	[°]	1.8 ±5%			
Type of mounting	Via internal thread				
Mounting position	Any				
Product weight					
Without brake	[g]	475	900	1350	2200
With brake	[g]	–	960	1500	2380

1) Without payload in new condition

Mechanical data					
Size	12	16	25	32	
Nominal torque <sup>1)</sup>	[Nm]	0.15	0.8	2.5	5
Holding torque	[Nm]	0.33	0.81	4	7
Nominal rotational speed	[rpm]	100	100	66	50
Max. speed	[rpm]	200	200	150	100
Permissible mass moment of inertia	[kgm <sup>2</sup> x10 <sup>-4</sup> ]	3	13	65	164
Mass moment of inertia J <sub>o</sub>	[kgm <sup>2</sup> x10 <sup>-4</sup> ]	0.0079	0.0383	0.114	0.39
Max. impact energy	[Jx10 <sup>-4</sup> ]	0.2	0.7	1.6	2.9

1) Theoretical torque at nominal rotary speed → 8

# Rotary drives ERMO, electric

Technical data

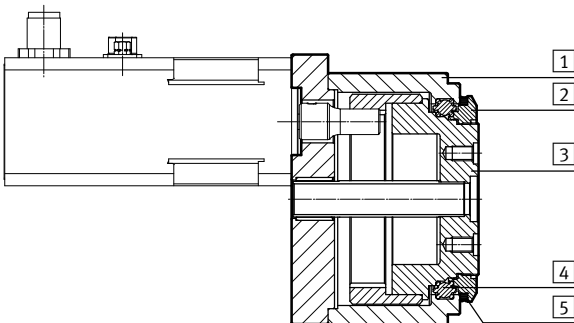
Electrical data		12	16	25	32
<b>Motor</b>					
Nominal operating voltage	[V DC]	24			
Nominal current	[A]	0.8	1.4	3	4.2
Duty cycle	[%]	100			
<b>Brake</b>					
Nominal voltage	[V DC]	–		24	
Rated output	[W]	–		8	
Holding torque	[Nm]	–		1	2.5
Mass moment of inertia	[kgm <sup>2</sup> x10 <sup>-4</sup> ]	–		0.69	1.3
<b>Encoder</b>					
Rotary position encoder		Incremental			
Rotary position encoder measuring principle		Opto-electrical			
Pulses/revolution	[1/rev]	500			
Interface		RS422, TTL, AB channel + zero index			
Operating voltage	[V DC]	5			
Insulation protection class		B (130 °C)			

Operating and environmental conditions		
Ambient temperature	[°C]	0 ... +50
Storage temperature	[°C]	–20 ... +60
Degree of protection		IP40
Relative air humidity	[%]	0 ... 85 (non-condensing)
Corrosion resistance class CRC <sup>1)</sup>		1
CE marking (see declaration of conformity)		To EU EMC Directive <sup>2)</sup>
Approval certificate		RCM trademark

- 1) Corrosion resistance class CRC 1 to Festo standard FN 940070  
Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).
- 2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: [www.festo.com/sp](http://www.festo.com/sp) → User documentation.  
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

## Materials

Sectional view

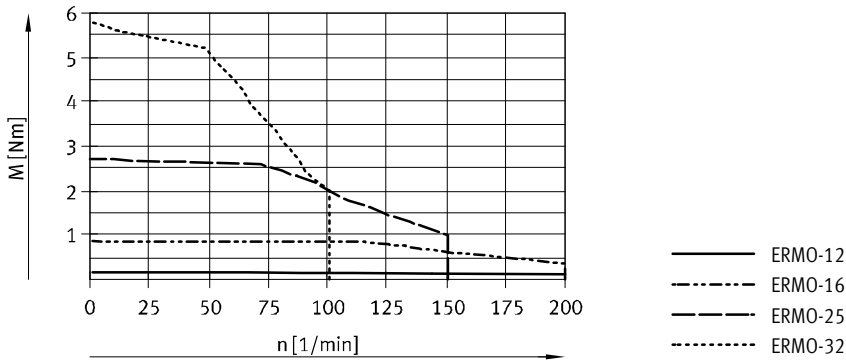


Rotary drive		
1	Housing	Anodised wrought aluminium alloy
2	Clamping ring	Anodised wrought aluminium alloy
3	Rotating plate	Anodised wrought aluminium alloy
4	Ball bearing	Rolled steel
5	Sealing ring	NBR
Note on materials		RoHS compliant
		Contains paint-wetting impairment substances

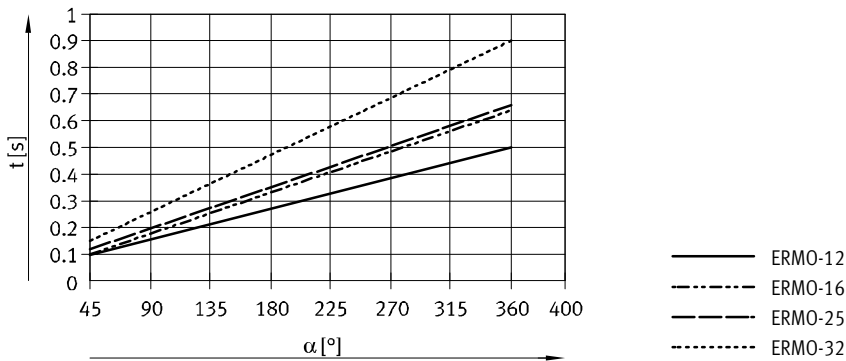
# Rotary drives ERMO, electric

Technical data

## Torque M as a function of speed n



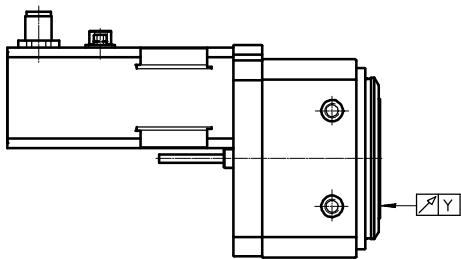
## Positioning time t as a function of angle of rotation α



## Axial eccentricity and concentricity

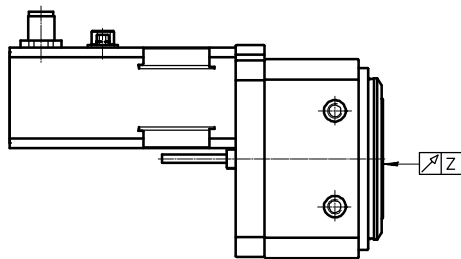
### Axial eccentricity

Measured on the surface of the rotating plate at the plate edge, in new condition.



### Concentricity

Measured at the centring hole of the rotating plate, in new condition.



Size		12	16	25	32
Axial eccentricity Y	[mm]	<0.02	<0.02	<0.02	<0.04
Concentricity Z	[mm]	<0.02	<0.02	<0.02	<0.04

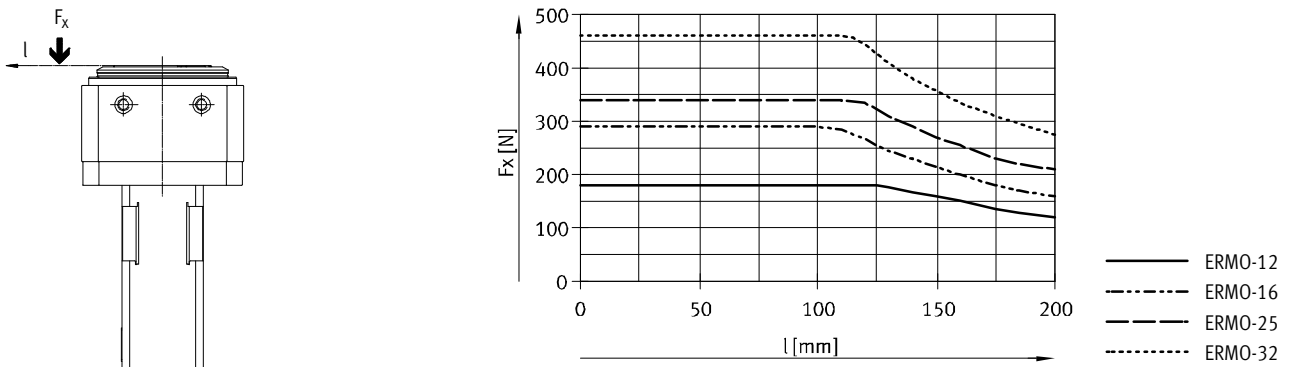


# Rotary drives ERMO, electric

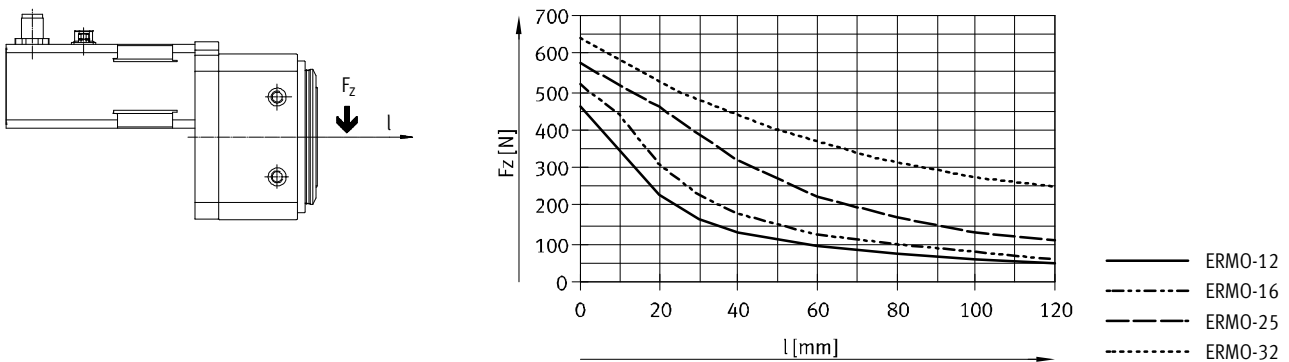
Technical data

Max. permissible axial and radial force $F_x/F_z$					
Size		12	16	25	32
<b>Static</b>					
Axial force $F_x$	[N]	500	600	700	800
Radial force $F_z$	[N]	500	750	1200	2000
<b>Dynamic</b>					
Axial force $F_x$	[N]	180	290	350	450
Radial force $F_z$	[N]	200	300	450	550

Max. dynamic axial force  $F_x$  as a function of lever arm  $l$



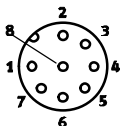
Max. dynamic radial force  $F_z$  as a function of lever arm  $l$



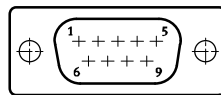
## Pin allocation

Motor

ERMO-12/-16

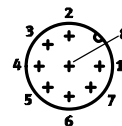


ERMO-25/-32



Encoder

ERMO-12/-16/-25/-32



PIN	Function
1	String A
2	String A/
3	String B
4	String B/
5	n.c.
6	n.c.
7	Brake +24 V DC <sup>1)</sup>
8	Brake GND <sup>1)</sup>
-	-

PIN	Function
1	String A
2	String A/
3	String B
4	String B/
5	n.c.
6	n.c.
7	Brake +24 V DC <sup>1)</sup>
8	Brake GND <sup>1)</sup>
9	n.c.

PIN	Function
1	Signal trace A
2	Signal trace A/
3	Signal trace B
4	Signal trace B/
5	GND encoder
6	Signal trace N
7	Signal trace N/
8	VCC auxiliary supply +5 V
GND	Shield on plug housing

1) Only on motors with brake.

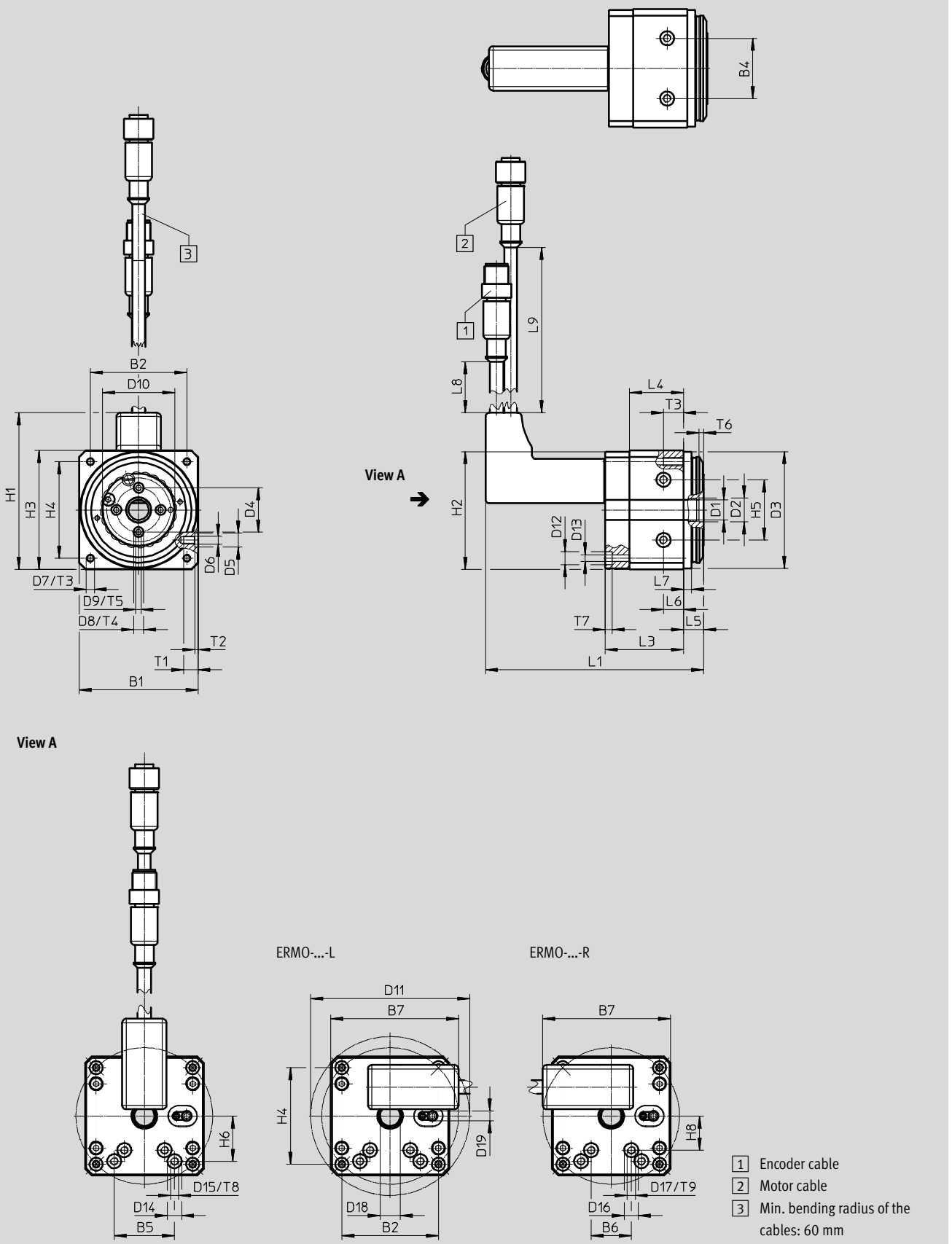
# Rotary drives ERMO, electric

Technical data

**Dimensions**

Download CAD data → [www.festo.com](http://www.festo.com)

Size 12



## Rotary drives ERMO, electric

Technical data

Size	B1	B2	B4	B5	B6	B7	D1	D2	D3	D4
	±0.3		±0.03	±0.02	±0.02		∅	∅ H8	∅ f8	∅ ±0.02
12	59	48	30	30	20	46	10	12	58	22

Size	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
	∅ H7			∅ H7		∅	∅ ±0.5	∅	∅	∅ H7
12	7	M4	M4	5	M3	36	79	6.5	3.4	7

Size	D15	D16	D17	D18	D19	H1	H2	H3	H4	H5
		∅ H7		max.				±0.3		±0.03
12	M4	7	M4	7	M5x0.5	80	58.5	59	48	30

Size	H6	H8	L1	L3	L4	L5	L6	L7	L8	L9
			±1.5	±0.6		±0.2	±0.1	±0.1		
12	22.5	17	100	39	27	10	10	4	300	300

Size	T1	T2	T3	T4	T5	T6	T7	T8	T9
		+0.1		+0.1		+0.1			
12	7	1.5	10	1.2	7	2.5	3.4	1.5	1.5

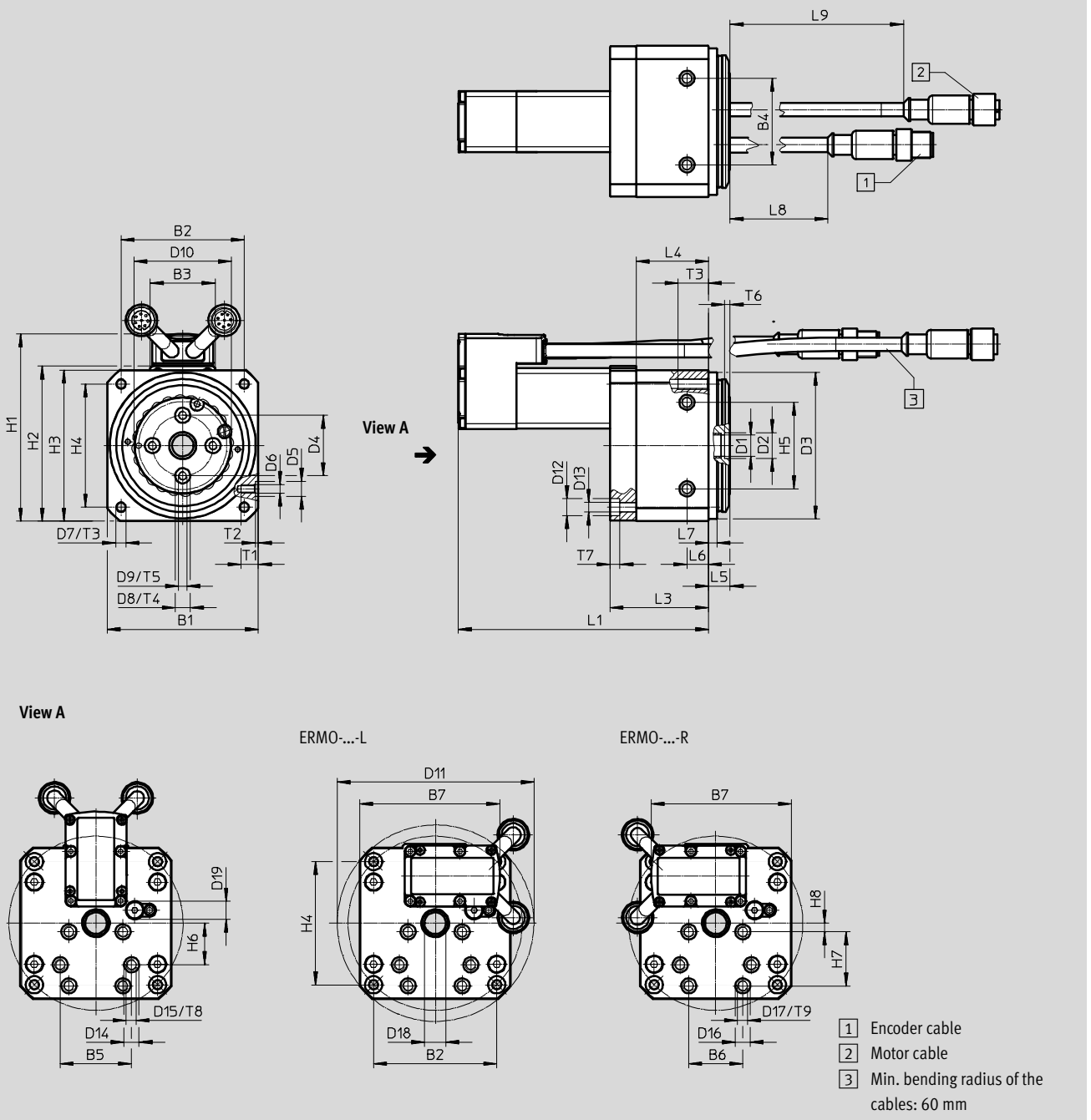
# Rotary drives ERMO, electric

Technical data

**Dimensions**

Download CAD data → [www.festo.com](http://www.festo.com)

Size 16



## Rotary drives ERMO, electric

Technical data

Size	B1	B2	B3	B4	B5	B6	B7	D1 ∅	D2 ∅ H8	D3 ∅ f8	D4 ∅ ±0.02
16	±0.3			±0.03	±0.02	±0.02		10	12	68	28

Size	D5 ∅ H7	D6	D7	D8 ∅ H7	D9	D10 ∅	D11 ∅ ±0.5	D12 ∅	D13 ∅	D14 ∅ H7
16	7	M5	M5	7	M4	45	91	8	4.6	7

Size	D15	D16 ∅ H7	D17	D18 max.	D19	H1	H2	H3 ±0.3	H4	H5 ±0.03
16	M5	7	M5	–	M8x1	87	71.8	70	57	40

Size	H6	H7 ±0.02	H8	L1 ±1.5	L3 ±0.6	L4	L5 ±0.2	L6 ±0.1	L7 ±0.1	L8
16	19.3	25	4	116/142 <sup>1)</sup>	45.5	33.5	10	10	4	250

Size	L9	T1	T2 +0.1	T3	T4 +0.1	T5	T6 +0.1	T7	T8	T9
16	350	8	1.5	14	1.5	8	2.5	4.5	1.5	1.5

1) Motor with brake

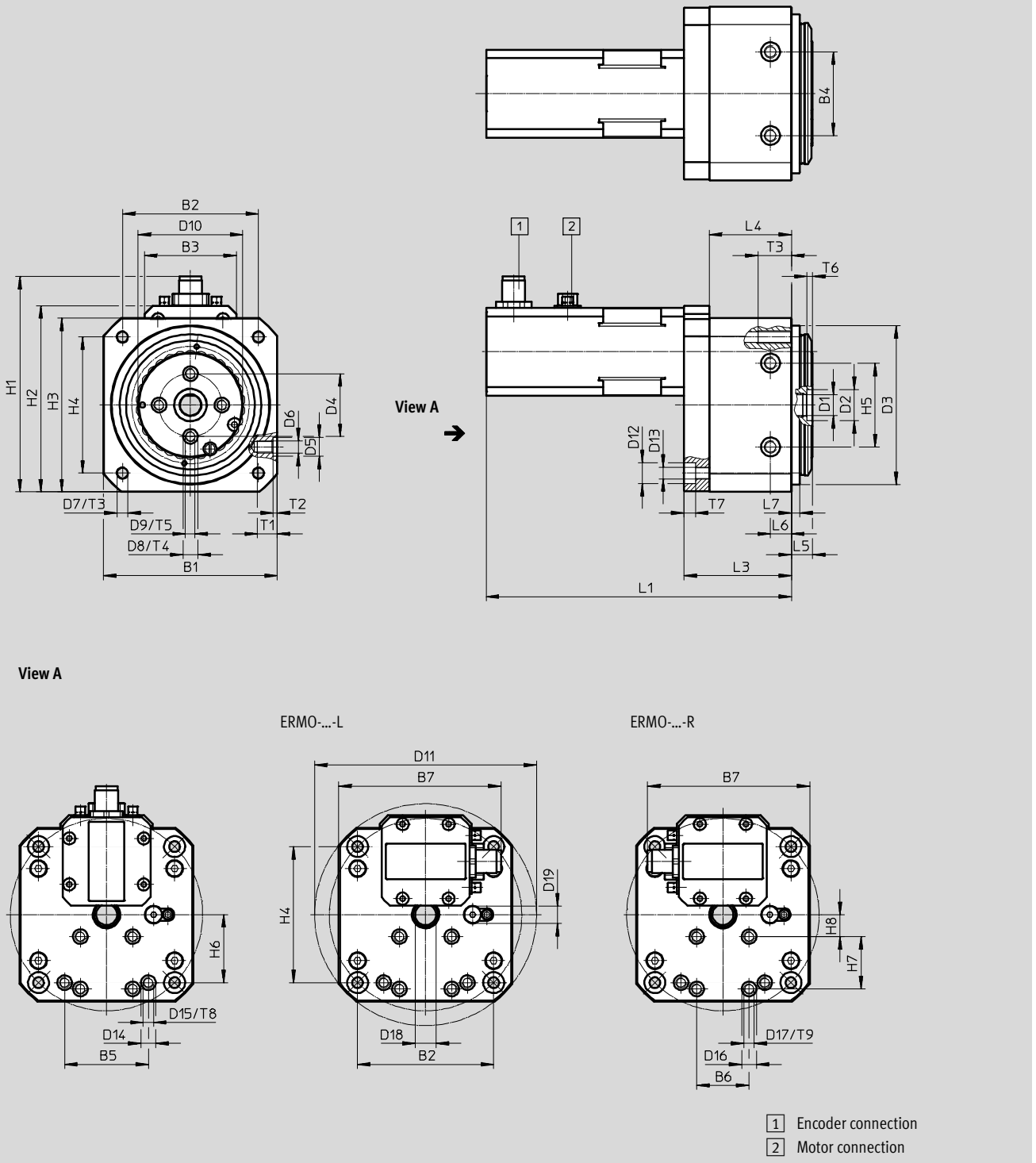
# Rotary drives ERMO, electric

Technical data

**Dimensions**

Download CAD data → [www.festo.com](http://www.festo.com)

Size 25/32



## Rotary drives ERMO, electric

Technical data

Size	B1 ±0.3	B2	B3	B4 ±0.03	B5 ±0.02	B6 ±0.02	B7	D1 ∅	D2 ∅ H8	D3 ∅ f8	D4 ∅ ±0.02
25	83	65	44	40	40	25	78	10	15	76	30
32	105	85	58	60	-	25	96	16	20	96	42

Size	D5 ∅ H7	D6	D7	D8 ∅ H7	D9	D10 ∅	D11 ∅ ±0.5	D12 ∅	D13 ∅	D14 ∅ H7
25	9	M6	M6	7	M5	50	106	10	5.5	7
32	12	M8	M8	7	M5	65	135	11	6.6	-

Size	D15	D16 ∅ H7	D17	D18 max.	D19	H1	H2	H3 ±0.3	H4	H5 ±0.03
25	M5	7	M5	10	M8x1	103	89	83	65	40
32	-	7	M5	9	M8x1	125	110.5	105	85	60

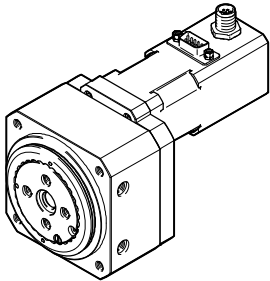
Size	H6	H7 ±0.02	H8	L1 ±1.5	L3 ±0.6	L4	L5 ±0.2	L6 ±0.1	L7 ±0.1
25	32.5	25	10.5	146/179 <sup>1)</sup>	51.3	39.3	10	10	4
32	-	25	15	148/189 <sup>1)</sup>	46.5	34.5	12	10	6

Size	T1	T2 +0.1	T3	T4 +0.1	T5	T6 +0.1	T7	T8	T9
25	9.5	2	16	1.5	8.5	2.5	5.5	1.5	1.5
32	15	2.5	20	1.5	10	2.8	6.8	-	1.5

1) Motor with brake

## Rotary drives ERMO, electric

Technical data

Ordering data			
	Size	Part No.	Type
	12	3008525	ERMO-12-ST-E
	16	3008526	ERMO-16-ST-E
	25	3008527	ERMO-25-ST-E
	32	3008528	ERMO-32-ST-E



# Rotary drives ERMO, electric

Ordering data – Modular products

Ordering table							
Size	12	16	25	32	Condi- tions	Code	Entry code
<b>M</b> Module no.	<b>2954695</b>	<b>2954696</b>	<b>2954697</b>	<b>2954698</b>			
Function	Electric cylinders					<b>ERMO</b>	ERMO
Size	12	16	25	32		-...	
Motor type	Stepper motor					<b>-ST</b>	-ST
Measuring unit	Encoder					<b>-E</b>	-E
<b>O</b> Brake	None						
	-	With brake				<b>B</b>	
Cable outlet direction	Top (standard)						
	Left					<b>-L</b>	
	Right					<b>-R</b>	
Connecting cable to motor controller	Without						
	1.5 m, straight plug connector					<b>+1.5E</b>	
	2.5 m, straight plug connector					<b>+2.5E</b>	
	5 m, straight plug connector					<b>+5E</b>	
	7 m, straight plug connector					<b>+7E</b>	
	10 m, straight plug connector					<b>+10E</b>	
	-		1.5 m, angled plug connector			<b>+1.5EA</b>	
	-		2.5 m, angled plug connector			<b>+2.5EA</b>	
	-		5 m, angled plug connector			<b>+5EA</b>	
	-		7 m, angled plug connector			<b>+7EA</b>	
-		10 m, angled plug connector			<b>+10EA</b>		
Controller type	None						
	CMMO, 5 A				<b>1</b>	<b>+C5</b>	
Bus protocol/activation	None						
	Digital I/O interface					<b>DIO</b>	
	IO-Link					<b>LK</b>	
Switching input/output	None						
	NPN				<b>2</b>	<b>N</b>	
	PNP					<b>P</b>	

**1** **DIO, LK, N, P** Must be selected if controller type +C5 is selected.

**2** **N** Not with IO-Link LK

**M** Mandatory data

**O** Options

Transfer order code

**ERMO** -  - **ST** - **E**  -  +  +

## Rotary drives ERMO, electric

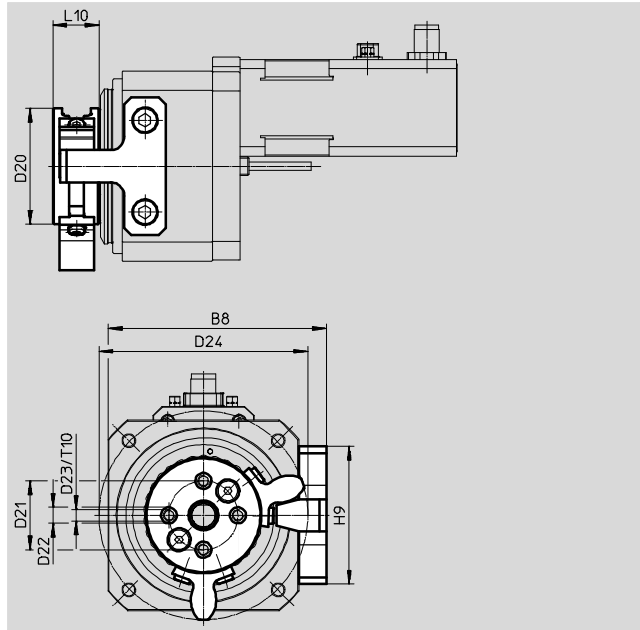
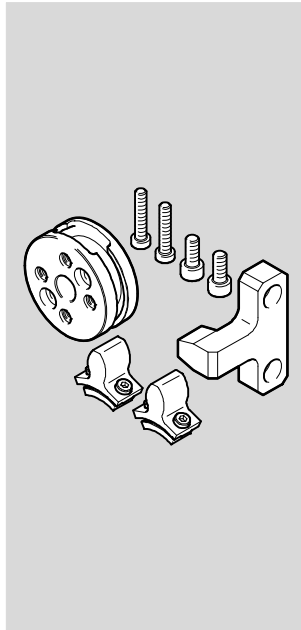
Accessories

### Stop kit EADP

Materials:

Housing: Anodised aluminium

Stops: Nickel-plated beryllium bronze






Dimensions and ordering data									
For size	B8	D20 Ø ±0.1	D21 Ø ±0.1	D22 Ø H7	D23	D24 Ø	H9	L10 ±0.1	T10
12	69	44	28	7	M4	74.8	40	16	16
16	80	44	28	7	M4	74.2	52	16	16
25	95	50.5	30	7	M5	91	60	20	20
32	120	64	42	7	M5	90	80	27	27



For size	Setting range for rotation angle		Weight [g]	Part No.	Type
	1 stop	2 stops			
12	0 ... 325	0 ... 280	96	3044562	EADP-ES-R3-12
16	0 ... 325	0 ... 280	100	2715501	EADP-ES-R3-16
25	0 ... 325	0 ... 270	210	2721599	EADP-ES-R3-25
32	0 ... 325	0 ... 270	290	2735411	EADP-ES-R3-32



## Rotary drives ERMO, electric

Accessories

Ordering data – Centring sleeves			Technical data → Internet: zbh		
	For size	Description	Part No.	Type	PU <sup>1)</sup>
	12, 16	For centring the drive for lateral mounting	<b>186717</b>	<b>ZBH-7</b>	10
	25		<b>150927</b>	<b>ZBH-9</b>	
	32		<b>189653</b>	<b>ZBH-12</b>	
	12 ... 32	For centring attachments on the rotating plate	<b>186717</b>	<b>ZBH-7</b>	
	12, 16	For centring attachments in the middle of the rotating plate	<b>189653</b>	<b>ZBH-12</b>	1
	25		<b>191409</b>	<b>ZBH-15</b>	
	32		<b>150901</b>	<b>SLZZ-25/16</b>	

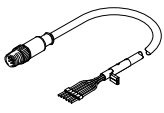
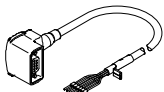
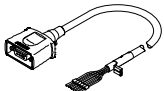
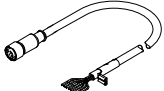
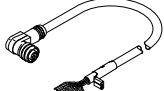
1) Packaging unit

Ordering data – Proximity sensor M5/M8 (round design), inductive						Technical data → Internet: sien	
	Switching element function	Electrical connection	LED	Switching output	Cable length [m]	Part No.	Type
For size 12							
	N/C contact	Cable, 3-wire	■	PNP	2.5	<b>150374</b>	<b>SIEN-M5B-PO-K-L</b>
		Plug connector M8x1, 3-pin			–	<b>150375</b>	<b>SIEN-M5B-PO-S-L</b>
For size 16 ... 32							
	N/C contact	Cable, 3-wire	■	PNP	2.5	<b>150390</b>	<b>SIEN-M8B-PO-K-L</b>
		Plug connector M8x1, 3-pin			–	<b>150391</b>	<b>SIEN-M8B-PO-S-L</b>

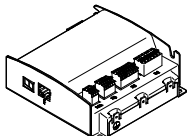
Ordering data – Connecting cables				Technical data → Internet: nebu	
	Electrical connection, left	Electrical connection, right	Cable length [m]	Part No.	Type
	Straight socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	<b>159420</b>	<b>SIM-M8-3GD-2,5-PU</b>
			2.5	<b>541333</b>	<b>NEBU-M8G3-K-2.5-LE3</b>
			5.0	<b>541334</b>	<b>NEBU-M8G3-K-5-LE3</b>
	Angled socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	<b>541338</b>	<b>NEBU-M8W3-K-2.5-LE3</b>
			5.0	<b>541341</b>	<b>NEBU-M8W3-K-5-LE3</b>

# Rotary drives ERMO, electric

Accessories

Ordering data – Cables <sup>1)</sup>					
	For size	Description	Cable length [m]	Part No.	Type
<b>Motor cable</b>					
	12, 16	Straight plug connector			
		– Min. bending radius: 62 mm – Suitable for use with energy chains – Ambient temp.: –40 ... +80 °C	1.5	1449600	NEBM-M12G8-E-1.5-Q5-LE6
			2.5	1449601	NEBM-M12G8-E-2.5-Q5-LE6
			5.0	1449602	NEBM-M12G8-E-5-Q5-LE6
			7.0	1449603	NEBM-M12G8-E-7-Q5-LE6
10.0	1449604		NEBM-M12G8-E-10-Q5-LE6		
	25, 32	Angled plug connector			
		– Min. bending radius: 62 mm – Suitable for use with energy chains – Ambient temp.: –40 ... +80 °C	1.5	1450736	NEBM-S1W9-E-1.5-Q5-LE6
			2.5	1450737	NEBM-S1W9-E-2.5-Q5-LE6
			5.0	1450738	NEBM-S1W9-E-5-Q5-LE6
			7.0	1450739	NEBM-S1W9-E-7-Q5-LE6
10.0	1450740		NEBM-S1W9-E-10-Q5-LE6		
	25, 32	Straight plug connector			
		– Min. bending radius: 62 mm – Suitable for use with energy chains – Ambient temp.: –40 ... +80 °C	1.5	1450368	NEBM-S1G9-E-1.5-Q5-LE6
			2.5	1450369	NEBM-S1G9-E-2.5-Q5-LE6
			5.0	1450370	NEBM-S1G9-E-5-Q5-LE6
			7.0	1450371	NEBM-S1G9-E-7-Q5-LE6
10.0	1450372		NEBM-S1G9-E-10-Q5-LE6		
<b>Encoder cable</b>					
	12, 16, 25, 32	Straight plug connector			
		– Min. bending radius: 68 mm – Suitable for use with energy chains – Ambient temp.: –40 ... +80 °C	1.5	1451586	NEBM-M12G8-E-1.5-LE8
			2.5	1451587	NEBM-M12G8-E-2.5-LE8
			5.0	1451588	NEBM-M12G8-E-5-LE8
			7.0	1451589	NEBM-M12G8-E-7-LE8
10.0	1451590		NEBM-M12G8-E-10-LE8		
	25, 32	Angled plug connector			
		– Min. bending radius: 68 mm – Suitable for use with energy chains – Ambient temp.: –40 ... +80 °C	1.5	1451674	NEBM-M12W8-E-1.5-LE8
			2.5	1451675	NEBM-M12W8-E-2.5-LE8
			5.0	1451676	NEBM-M12W8-E-5-LE8
			7.0	1451677	NEBM-M12W8-E-7-LE8
10.0	1451678		NEBM-M12W8-E-10-LE8		

1) Other cable lengths on request.

Ordering data – Motor controller			Technical data → Internet: cmmo	
	Description	Part No.	Type	
	With I/O interface			
	Switching input/output PNP	1512316	CMMO-ST-C5-1-DIOP	
	Switching input/output NPN	1512317	CMMO-ST-C5-1-DION	
	With IO-Link			
	Switching input/output PNP	1512320	CMMO-ST-C5-1-LKP	